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ABSTRACT

A study examined: (1) whether making decisions (i.e. answering yes/no questions) about a brief prose passage enables children to detect logical inconsistencies in the passage; and (2) the extent to which hearing-impaired children differ from normal hearing children in their abilities to recognize logical inconsistencies in text. Subjects were 52 hearing-impaired children (age ranges from 9.8 to 20.11 years) and 56 normal hearing children (age ranges from 7.4 to 11.7 years), reading at the second- to sixth-grade levels. The children read twice two brief paragraphs containing logical inconsistencies. Between the first and second readings, one-third of the children read and answered a series of yes/no questions about the paragraph, one-third read the questions but did not answer them, and one-third did not see the questions at all. Each child was then asked a series of probe questions to determine whether they had noticed the contradictions. Performance on the two paragraphs yielded completely different findings. Results demonstrated that the deaf children and the hearing children in these samples were approximately equal in their abilities to detect logical inconsistencies, at least when they possessed the necessary background knowledge. Findings on the effectiveness of the read-and-answer-questions treatment were inconclusive, and suggested that their usefulness may depend on the familiarity of the information presented in the text. Findings underscore the importance of preparing students to receive new information in order that they can make connections with their existing knowledge. (SR)

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DEAF AND HEARING CHILDREN'S DETECTION OF LOGICAL INCONSISTENCIES IN TEXT

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OBJECTIVES

The purpose of this study was twofold: (1) to determine whether making decisions (i.e., answering yes/no questions) about a brief prose passage enables children to detect logical inconsistencies in the passage, and (2) to determine the extent to which hearing-impaired children differ from normal hearing children in their abilities to recognize logical inconsistencies in text.

THEORETICAL FRAMEWORK

A number of studies have demonstrated that children are surprisingly tolerant of ambiguities, contradictions, and plain untruths in passages they listen to or read (Garner & Taylor, 1982; Markman, 1977, 1979). Although many children may be capable of noticing contradictions in text, most children do not do so spontaneously. The metacognitive skill of monitoring one's comprehension during reading develops after basic reading skills have been mastered (Flavell, 1977; Markman, 1979).

It has been well documented that, in general, the educational achievement of profoundly deaf students lags behind that of students with normal hearing (Babbidge, 1965; Lane, 1976; Lane & Baker, 1974; Wrightstone, Aranow, & Moskowitz, 1963). Skill areas in which this discrepancy is most apparent are reading comprehension (especially paragraph meaning and word meaning tasks), arithmetic reasoning, and problem solving. It seems reasonable to suggest that deaf children's development of metacognitive skills such as comprehension monitoring, including the ability to detect logical inconsistencies in prose, is similarly deficient. Therefore, we hypothesized that normal hearing children would identify inconsistencies in a prose passage more readily than hearing-impaired children, even when reading ability is statistically controlled.

According to the depth of processing position (Craik, 1973; Craik & Lockhart, 1972), information that is processed at a "deeper" level is more likely to be associated with other elements of a text and with the reader's previous knowledge. This deeper processing enables readers to comprehend and evaluate the complexities of the text. Until a person has processed the information to an adequate depth, s/he would not be aware of a contradiction in the text. It has also been shown that making decisions about the meaning of information from a prose passage results in greater levels of recall of target material (Benton, Glover, & Bruning, 1983; Glover, Plake, & Zimmer, 1982; Jacoby, Craik, & Begg, 1979). These research findings imply that the reason decisions have a facilitative effect on memory is that they increase the depth at which the

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information is processed. We hypothesized that making decisions in response to yes/no questions about a prose passage would induce readers to process information at deeper levels and would enable them to detect logical inconsistencies.

SUBJECTS AND METHOD

Fifty-two hearing-impaired children and 56 normal hearing children participated in the study. All children scored at the second- to sixth-grade level on a standardized reading test. The hearing children ranged in age from 7.4 to 11.7 years (mean = 9.5) and the hearing-impaired children ranged in age from 9.8 to 20.11 (mean = 15.1) and had average HTLs in the speech range in the better ear from 38 dB to 125 dB (mean = 96 dB).

Two brief paragraphs were created so that they contained logical inconsistencies that were explicitly stated. All children read each paragraph twice. Between the first and second readings, one third of the children read and answered a series of yes/no questions about the paragraph, one third read the questions but did not answer them, and one third did not see the questions at all. Each child was then asked a series of probes to determine whether s/he noticed the contradiction in the paragraph. As soon as a child indicated that s/he noticed the inconsistency, probe questions were discontinued. A child's score was the number of probe questions that had been asked when the child indicated the s/he noticed the inconsistency. Each child was then asked to repeat as much of the story as s/he could remember, and their recall was recorded.

RESULTS AND CONCLUSIONS

Performance on the two paragraphs employed in the study yield completely different findings. Results from the "fish" story indicate that the activity of reading and answering yes/no questions was beneficial to the hearing-impaired children but not to the normal hearing children. In fact, the hearing children who did not see any questions detected more inconsistencies than those who saw questions. This aptitude-treatment interaction suggests that the treatment aided the deaf children, but interfered with the performance of the hearing children. Results from the "ice cream" story were the reverse: the deaf children who did not receive questions achieved the best scores in the entire study, whereas the hearing children performed about the same regardless of their treatment condition. A three-way analysis of variance yielded significance only for the story effect ($F_{1,102} = 8.82$, $p = .004$).

We can hypothesize a plausible explanation for the disparate results from the two paragraphs: the two stories required different amounts of background knowledge to notice the inconsistencies. The "fish" story described how fish can see the color of their food in the dark, and required an elementary knowledge of optics (e.g., that light is needed in order to see; colors cannot be perceived in darkness). The "ice cream" story, on the other hand, did not require any special knowledge. It described the making of a fancy dessert in which ice cream is placed in an oven but does not melt. Most children have experience with ice cream and ovens, and know what effect heat has on ice cream. It may be that subjects were able to detect the inconsistency in the ice cream story more readily than the one in the fish story because they possessed the knowledge and experience necessary to discover that something in the paragraph did not make sense.

In general, subjects performance was lower than expectations based on previous studies involving error detection (Markman, 1977, 1979). Children's responses to the probe questions may have been partly a function of the task demands. That is, the children may have responded the way they thought the experimenter wanted them to respond. They may have been hesitant to express their criticisms of the stories for fear of appearing ignorant or because they were unaccustomed to finding fault with an adult.

Our results demonstrate that the deaf children and the hearing children in these samples are approximately equal in their abilities to detect logical inconsistencies, at least when they possess the necessary background knowledge. This finding may indicate that comprehension monitoring skills follow a similar developmental pattern in deaf children as in hearing children. Additional research is necessary to determine the degree to which we can generalize this finding.

Findings on the effectiveness of the read-and-answer-questions treatment are inconclusive. Our results indicate that the usefulness of making yes/no decisions for the purpose of promoting comprehension monitoring may depend on the familiarity of the information presented in the text. Deaf children were aided by the read-and-answer-questions treatment on the story that required specific prior knowledge and outperformed the hearing children who received the same treatment. However, on the story that required no special prior knowledge, the deaf children surpassed the hearing children when they were given no treatment at all. When one considers the frequent observation that deaf children exhibit qualitative and quantitative differences in their general knowledge as compared with hearing children, this finding suggests that instructional techniques that foster deeper processing may be different for these two populations. This may be true especially when the material to be comprehended requires specific knowledge that deaf children may not have. Further research is needed that systematically controls the amount of prior knowledge required to comprehend a passage of text.

EDUCATIONAL IMPLICATIONS

The importance of a reader's prior knowledge and experience during reading comprehension has been well documented (Anderson, 1984; Ausubel, 1963). The results of this study are in agreement with that research: If a reader does not possess the background knowledge necessary to comprehend a text, s/he may not fully understand it. In fact, the reader may believe s/he has understood a message that, because of an inconsistency, is impossible to comprehend. These findings underscore the importance of preparing students to receive new information in order that they can make connections with their existing knowledge. This can be accomplished in a variety of ways: through lesson introductions that stimulate recall of pertinent knowledge already possessed by students, through the use of analogies (Hayes & Tierney, 1982; Royer & Cable, 1976; Rumelhart & Norman, 1981) and advance organizers (Ausubel, 1963), and through the common teaching strategy of "pre-teaching" concepts to name a few. Because of deficiencies in general knowledge, deaf children may require more of this preparation than hearing children. Teachers and instructional designers can facilitate reading comprehension and learning by careful planning and sequencing of lessons, by preparing students to receive new information, and by indicating how new information relates to what they already know.